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*From the
SCS Chief*

Acreage Limitation Programs: Opportunities for Conservation

With one-fifth of the Nation's cropland pledged to this year's acreage reduction and diversion programs, farmers can put much soil and water conservation on the ground. We want to help them do it.

Under USDA's Payment-In-Kind (PIK) program and other acreage limitation programs, farmers are taking a record 82 million acres of cropland out of production. Farmers have an unparalleled opportunity this year to improve their soil and water conservation systems.

Many farmers will be taking some of their erosive and less productive lands out of annual crop use and planting nitrogen-fixing legumes and grasses as cover crops. This has the potential for saving soil and water resources as well as building up natural fertility.

At the same time, the Soil Conservation Service, conservation district leaders, and local agricultural stabilization and conservation committees will be urging farmers to consider installing permanent conservation practices as well on the more erosive acres. Terraces, grassed waterways, windbreaks, and other enduring practices can be installed now without interrupting cash crops. It is also a good time for planning ways to fit no-till or other conservation tillage methods into the farm operation.

In addition, we will be encouraging farmers to retire the most erosive or otherwise marginal lands that were brought into production during the export boom of the 1970's. These lands may be best suited for permanent grasses, trees, and wildlife habitat.

The 1983 programs offer farmers a rare opportunity to balance their short-term cash needs with their longer term conservation and productivity goals. SCS, the Agricultural Stabilization and Conservation Service, the Extension Service, and others stand ready to provide assistance.



Cover: At 12 feet above flood stage, the White River encroaches on silos storing grain near Augusta, Ark. After last December's severe flooding in Arkansas, Soil Conservation Service emergency watershed protection teams worked fast to determine where emergency help was needed. See article on page 3. (Photo by Randy Ferguson, district conservationist, SCS, Augusta, Ark.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

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Arkansas Calls for Emergency Help After Recordbreaking Rains

As December 1982 began, clouds gathering above Texas began moving northeast. Showers became pounding rain and tornado watches became warnings. Killer tornadoes and recordbreaking rains slashed through Arkansas. Five people died in the storm as it leveled houses and businesses, wiped out hundreds of county roads and bridges, uprooted trees, drowned livestock, and choked streams with debris.

On Friday, December 3, Soil Conservation Service area and district conservationists throughout Arkansas reported to the State office on conditions in their area. In some streams and rivers, the cubic feet of water discharged per second had reached two and three times higher than amounts ever previously recorded. Twenty-four counties reported exigencies where streams blocked by debris and streambank erosion threatened lives and property. On Saturday, December 4, the SCS State office requested Emergency Watershed Protection (EWP) Program funds from National Headquarters in Washington, D.C.

Over the next 3 days, four emergency watershed protection teams of about five people each headed out to assist SCS district conservationists in planning and contracting the emergency work. The teams, directed by SCS area conservationists, included economists, engineers, contract specialists, biologists, and others. Under the EWP program, funds for exigency projects must be obligated within 10 days and work completed in 30 days.

Out in the field, James Janski, SCS assistant State conservation engineer, reported that more than 70 percent of the flow capacity in many streams was blocked by uprooted trees, cars, trucks, and washing machines.

During the storm, water flow was recorded for the first time in 35 emergency spillways at dam sites in central and north-central Arkansas. Three dams

in the West Fork Point Remove Creek watershed actually overtopped. Because watershed project sponsors had operated and maintained the structures so well, the overtopping and water in spillways caused little damage. The dams and spillways actually functioned far beyond their design capacity, saving millions of dollars and possibly many lives.

The Arkansas Office of Emergency Services and the Federal Emergency Management Agency coordinated statewide emergency efforts. SCS worked with State, county, local, and other Federal agencies in planning and carrying out 54 exigency projects which involved restoring natural stream capacity by removing gravel, rock, and debris from waterways and stabilizing streambanks. Streambanks were shaped and seeded with a mixture of ryegrass, fescue, and oats or lined with cobbles and boulders that storm waters had washed up.

SCS also helped stabilize streambanks around major bridges to prevent further damage. Severe erosion had already

bared the abutments of many bridges, cut approaches, and isolated bridges in midstream. USDA's Agricultural Stabilization and Conservation Service provided emergency funds for repairing cropland damage.

On December 24, rain and tornadoes again ripped through rural and urban communities in Arkansas. The storm hit hardest in the eastern third of the State. Of 40 EWP projects already completed, four were damaged in the second storm. By January 15, 1983, 95 percent of the EWP exigency projects were complete. Costs for them will total about \$800,000.

The year 1982 ended with chaotic disruption to the lives of thousands of Arkansans and untold damage to the countryside. But SCS State and field personnel can be proud of their efforts to reduce threats from streams and rivers and make them safe again for the people who live near them.

Pearlie S. Reed,
deputy State conservationist, SCS, Little Rock, Ark.



For 3 days last December, the flood-swollen White River at Allison, Ark., saturated the yard and lower level of this house. The house, built on a loamy sand soil, used to stand 50 feet from the riverbank. When the flooding subsided, the backyard collapsed and the river washed it away.

Photo by Frank Rowlett,
district conservationist,
SCS, Mountain View, Ark.

Urbanites' Dreams Come True

The Trout Brook Watershed Project, the second-to-last phase of the South Branch Park River (Public Law 566) Watershed Project in Connecticut, will include several new landscape and design concepts when it is completed in 1984.

Trout Brook meanders through one of the few undisturbed open spaces in the town of West Hartford and residents wanted the flood protection project to retain as many of the area's natural qualities as possible. They were concerned about protecting fish and wildlife and native trees and shrubs.

Because of this concern, the town hired a consultant to prepare a master plan which the town council approved and presented to the Soil Conservation Service. A team of Soil Conservation Service specialists—which included Joseph Polulech, SCS State design and construction engineer, and Ron Tuttle, SCS national landscape architect—worked with local and State governments on adopting as many features of the plan as possible. When the Trout

Brook project is completed, it will demonstrate some innovative approaches to flood protection.

The project area covers about 50 acres and includes a 10,000-foot section of Trout Brook. The stream channel was widened and deepened but not straightened. Terraces at varying levels were built into the streambanks to provide secondary flood channels and to keep low flows in as narrow a channel as possible. This helps insure a continuous water supply for fish and wildlife. Fish shelter rocks were also placed on the stream bottom.

Directly in the stream channel five ponds were constructed, each about 4 feet deep, to serve as sediment traps and provide a water source for waterfowl and fish. The sediment will have to be cleaned out periodically.

Residents had requested that natural slab rock be used to line stream channels, but the cost was too high. Residents agreed to the use of concrete cellular blocks. The open areas of the grids are filled with topsoil and seeded with grasses to create a vegetated bank effect. Polulech says the cellular blocks have been in limited use in the United

States since the fifties. He says they were developed in the Netherlands where community planners have much experience with shoreline erosion along dikes, dams, and levees.

Residents also requested that all exposed concrete be colored and textured to make it resemble native rock, which is brownstone. The project calls for 900 cubic yards of the reddish brown architectural concrete and 12,000 cubic yards of regular concrete, which is not exposed. All chain link fencing will be coated with black polyvinyl chloride to blend in with the landscape. Plans call for planting 1,500 trees and shrubs while preserving as much existing vegetation as possible, especially native trees and shrubs.

The final effect of the project will be a linear park made up of mini-parks. Mounds of excavated waste material will be shaped and seeded to add variety to the landscape. About 1,000 feet of Trout Brook will flow underground through a reinforced concrete conduit which has four 13-foot square openings. The area over the conduits will be used for parking and open space.

Costs for the \$14 million flood



Above, Trout Brook meanders through the town of West Hartford, Conn. Residents wanted the flood protection project to retain the area's natural qualities.



Above, new plantings grace the streambank by one of the five ponds built in the channel. At right, concrete cellular grids will be filled with topsoil and seeded with grasses.

protection project will be shared by the project sponsor, the Connecticut Department of Environmental Protection; the town of West Hartford; the Federal Highway Administration; the State Department of Transportation; and SCS.

Flood damages have occurred periodically throughout the Park River watershed since it was first settled in colonial times. Property losses from the 14.4-inch rainfall of Hurricane Diane in August 1955 exceeded \$4.5 million. More than 1,000 houses and 190 commercial, industrial, and public buildings were damaged. When the Trout Brook flood control project is complete, more than 200 homeowners and many businesses will no longer have to pay flood insurance premiums. An average homeowner pays about \$150 a year for the insurance, which is cost-shared by the Federal Government.

Through the Trout Brook watershed project, SCS has taken an innovative approach to meet residents' needs by combining esthetics with flood control.

Vern Anderson,
district conservationist, SCS, Windsor, Conn.

Conservation Farmers Save Government \$2 Million

Conservation practices applied to cropland by farmers in the Lindsay Creek watershed in Nez Perce County, Idaho, are expected to save the government at least \$2 million.

According to Dale Smelcer, an engineer with the U.S. Army Corps of Engineers in Walla Walla, Wash., the conservation treatment of the watershed will enable the corps to select a cheaper alternative to flooding and sediment removal problems at an outlet culvert for Lindsay Creek into the Clearwater River.

Lindsay Creek floods during 1975 and 1979 nearly filled the outlet with silt and gravel. Costs for sediment removal for the two flood events totaled over \$60,000. Soil losses were measured at more than 100 tons per acre on the watershed in 1979.

"It appeared that in order to avoid high maintenance costs and provide flood protection to part of the city of Lewiston, the silt would need to be trapped upstream in a floodwater retention dam," said Smelcer. "The cost of such a structure would be at least \$2 million and require relocation of perhaps 10 homes.

"However, at this stage of our investigation, it looks like the conservation applied will enable us to continue a maintenance program and avoid costly structural measures," he said.

Over 65 percent of the watershed is under the management of five major landowners, according to Byron Chase, Soil Conservation Service district conservationist at Lewiston. The farmers raise crops such as winter wheat, spring barley, peas, and rape on the rolling and undulating dry cropland. The rest of the watershed is divided among smaller parcels and residential developments.

"The farmers are all innovators in advancing conservation practices such as stripcropping, crop residue use, conservation tillage, and stubble mulch," said Chase. "These practices are all advocated by SCS and the Nez Perce Soil Conservation District (SCD) for

controlling erosion, reducing runoff, and improving water quality. Because of their active voluntary participation in the conservation program, the upper portion of the watershed is adequately treated and protected. We provided technical assistance when requested, but the actual land management decisions were made by the farmers."

One of the farmers, Tom Wagner, practices stubble mulch and intensive crop residue use. Wagner manages his crop residues to an extent rarely practiced elsewhere in the county.

"We measured 4,000 pounds per acre of residue on a field of seeded winter wheat in April 1982," said Chase.

McIntosh and Sons, another of the operators, are respected innovators in conservation tillage and new equipment such as air seeders. McIntosh installed a stripcropping system on about 1,100 acres in 1980 and used conservation tillage on 5,000 acres in 1981.

Ron Wittman, operator of Shaub Ranch, is a pioneer of chemical fallow, a herbicide program that maintains enough surface residue for soil protection. "He installed a 918-acre stripcropping system in October 1980, and followed up with another 1,100 acres in 1981," said Chase. Wittman, who eliminated the use of the moldboard plow 2 years ago, received the Conservation Farmer of the Year Award from the Nez Perce SCD in 1981.

Ralph Nichols also uses a chisel as his primary tillage implement and practices contour farming. His crop residue management system is excellent, according to Chase, and he applies a buffer stripcropping system around the edge of each field to contain sediment.

George and Bert Henriksen, respected leaders in grain variety trials, use green manure crops to promote soil organic matter and increase soil infiltration rates. They installed five drop structures on their land in early 1980 to inhibit back-cutting of gullies.

Sharon Norris,
public affairs specialist, SCS, Boise, Idaho



Trailblazing for Wildlife

The Heifer Project International Livestock Center, a 1,200-acre ranch located 40 miles west of Little Rock, Ark., is a scenic showcase thanks to Soil Conservation Service Biologist Bob Price, his 11-year-old son, Michael, and other weekend volunteers.

Heifer Project International (HPI)—a non-profit, interfaith organization—gives livestock to poor farmers in the rural United States and throughout the world, as part of a carefully planned self-help program that requires the farmers to give some of their livestock offspring to their neighbors. The ranch also provides the training necessary to raise the livestock successfully.

HPI has worked with the Perry County Conservation District and SCS for a long time. Price and Dick Vogan, SCS's first landscape architect, helped ranch officials design a conservation plan for the ranch with less fencing and more plantings, as one part of an ongoing conservation plan. For example, wherever the ranch roads ran between two fences, they suggested removing fence from one side of the road. For a 7-acre oxbow lake that had been partially drained by the ranch's previous owner, they recommended raising the water level with a levee and planting cypress trees and other trees and shrubs to attract wildlife and restore the lake to its former beauty.

Their plan called for wood duck boxes to be installed on poles in the lake and at other wetland areas on the ranch, and bluebird houses elsewhere. They also planned nature trails and a sign at the entrance to the ranch.

After helping to write the plan, Price put on his civilian hat and asked his local YMCA parent-child club, the Arkansas Trail Blazers, for volunteers to help put the plan into action. Price, his son, and nine other father-son teams came to the ranch and moved into a bunkhouse for a weekend of work and fun. The bunkhouse is painted with the names and logos of other volunteer groups that come from all over the country, especially the Midwestern States, to work at the ranch.

The Trail Blazers have done this a few times a year for the past few years and are almost done with their work. The cypress lake has attracted numerous species of shore birds. The Trail Blazers haven't planted all the cypress seedlings yet and they still have a section of nature trails to finish. They'll be working on these projects this year. And then they'll return to plant more trees and shrubs whenever the ranch can afford to buy more plants.

It looks as though the Trail Blazers have found themselves a never-ending task. They don't mind, however, because working day and night with their sons, from cooking breakfast to planting trees,

is what their club is all about: parents spending time alone with their children, doing something worthwhile, and having fun at the same time.

Certainly their work at the ranch demonstrates the beauty of wetland restoration and natural landscaping to the hundreds of people of all ages and from all over the world who visit the Livestock Center each year.

Anyone interested in more information on the ranch should write to: HPI at P.O. Box 808, Little Rock, Ark. 72203.

David Womack,
district conservationist, SCS, Perryville, Ark.

Pennsylvania Plants Waterfowl Paradise

USDA's resource conservation and development (RC&D) program helped the Pennsylvania Game Commission convert a little-used swamp into a wildlife paradise.

During the late sixties, the Game Commission bought land in central Crawford County from a man who had dug a series of ponds to create a fishing area. The man had built earthen dams and used railroad ties to build water outlet structures; but over the years, some of the railroad ties rotted and most of the structures collapsed, leaving dams that could not control the depth of water in the ponds.

SCS assisted the Penn Soil RC&D Council and the Crawford County Conservation District to plan and install two RC&D measures on this tract of land. They first corrected the problems with the series of ponds. SCS replaced the railroad-tie structures with ones made of galvanized metal. For the second project, SCS helped build a 7-acre pond on the opposite end of the tract. SCS recommended planting grasses and legumes, such as birdsfoot trefoil and clovers, on the dam and its spillway to control erosion and provide food for wildlife.

The RC&D measures provide a resting stop for waterfowl along the Atlantic



SCS Biologist Bob Price and his son Michael—along with other members of their YMCA club, the Trail Blazers—volunteer their time and labor to build nature trails and do other projects at the Heifer Project International Livestock Center. On February 17, 1982, the Governor of Arkansas honored the club by proclaiming the day "Arkansas Trail Blazer Day."

flyway. The ponds complement the Game Commission's goose management area in Pymatuning State Park, in the southwestern part of the county.

The Game Commission lowers the water level of the ponds after the waterfowl return to Canada in the spring. They plant the edges of the ponds with millet, maize, wild rice, and duckwheat. Then, in the fall, they flood the ponds to provide a resting and feeding area for the waterfowl on their way south.

The pasture of legumes and grasses in the dam area of the 7-acre pond has attracted upland wildlife such as whitetail deer, grouse, and rabbits, and beavers and muskrats have moved into the pond.

The area has also been transformed into a paradise for outdoor recreationists, from hikers to trappers. A local college has received permission to use the area for study, ranging from aquatic vegetation identification to ornithology.

The Game Commission built a parking lot along the State highway that runs near the pond and placed gravel on a service road through the wildlife tract so the road could be used year round.

Although this all-weather road is ordinarily closed to public vehicles, the game lands manager has let buses with senior citizen groups drive through and park so the senior citizens could enjoy the scenery and wildlife. In the winter, the road becomes a snowmobile trail.

John Vanderstappen, Crawford County Conservation District director, says, "Everyone benefits from a project like this—hunters, anglers, birdwatchers, nature lovers, senior citizens, and college students. That's the way our tax dollars should be spent."

William J. Branigan,
RC&D coordinator for Threshold to Maine RC&D area, SCS, Westbrook, Maine; formerly district conservationist, SCS, Meadville, Pa.

The Farm Pond That Came Back

In 1979, Pennsylvania dairy farmer Roy Kendig's bass began to die and his golden shiners stopped reproducing. He knew that erosion was filling his pond with sediment, but he wasn't sure if that was what was killing his fish.

To find the answer, Kendig traveled a short distance from his Orrstown area farm, in south-central Pennsylvania, to Shippensburg State College. He contacted Richard Wahl, associate professor of biology. Wahl tested the pond and found 2 parts per million of oxygen instead of the 7 parts per million needed in a healthy pond.

Wahl concluded that manure runoff from the feedlot adjacent to the pond was causing the oxygen shortage as animal wastes decayed in the pond.

During winter 1980, Kendig, a Franklin County Conservation District co-operator, came to the Soil Conservation Service for help in diverting the surface water away from his unhealthy pond. With technical assistance from SCS and cost-sharing from USDA's Agricultural Stabilization and Conservation Service, Kendig installed 530 feet of diversions to direct all of the surface water away from the pond. To further protect his pond, Kendig reseeded most of the bare feedlot that fall with 'Kentucky 31' tall fescue and reed canarygrass.

He covered one small part of the feedlot with shale and fenced it to keep the cows out of the grassed part. Kendig lets the cows into the grassed part only when the ground is dry and there is sufficient grass.

Regulating when the cows are in the pasture is a key item in Kendig's management. Before he sought SCS help, Kendig had 70 cows roaming the 3½-acre feedlot, year round, and there was no way he could maintain a desirable grass cover. Now he has a good grass cover which reduces the amount of runoff and manure leaving the lot. He also planted grasses in the diversions to filter the larger particles as the runoff flows around the pond to a hayfield.

Wahl restocked the pond with 3-inch largemouth bass in spring 1981 to replace those that had died. He also restocked some golden shiners. Seining of the pond in May 1982 revealed that some bass measured up to 10 inches and the golden shiners were once again reproducing. Wahl says these are good signs that the pond is returning to an acceptable fish habitat.

Now Kendig's feedlot and pond are more productive and attractive than ever. Thanks to Wahl and SCS, Kendig was greatly pleased with the solution to his manure runoff problem. He is sure that his pond will maintain a healthy habitat for fish. Kendig says he now knows that manure and fish are not compatible.

John Akers,
district conservationist, SCS, Chambersburg, Pa

Correction

The article on page 3 of the November 1982 issue of *Soil and Water Conservation News* stated that the new conservation district of the District of Columbia is the only completely urban district. In fact, it is one of several conservation districts in urban areas.

Prescribed Burning

SCS Prepares for Prescribed Burning of Rangeland

Through the dense smoke, so thick he cannot see the people he is talking to, the man gives orders by walkie-talkie. There are fire trucks at the scene and people have cleared land around the fire to keep it from spreading. But the man is not telling the people how to put out a fire, he's telling them how to set one.

For this fire boss is practicing prescribed burning, the controlled use of fire to manage brush and improve forage quality on rangeland and forest lands. The Soil Conservation Service supports and encourages prescribed burning on rangeland where fire has historically had an important role in the natural plant community and where burning can be done safely and effectively.

The energy crisis in the seventies raised the costs of conventional methods of brush control, including herbicides, high enough to force ranchers to switch to prescribed burning. In some areas, public opposition to certain chemicals used for brush control caused the change.

Don Pendleton, SCS national range conservationist, predicts that requests for SCS to assist with prescribed burning on rangeland will increase greatly in the next decade.

Prescribed burning improves forage by making room for young, green, succulent plants that are more palatable to livestock and wildlife, and by encouraging the germination of forage plants. Burning adds some nutrients to the soil, too, but some researchers believe that it is the palatability and the elimination of dead plant material that attract livestock and deer.

Pendleton says SCS is currently training its employees so they will be ready to give prescribed burning advice when asked. For example, SCS and the Cooperative Extension Service at Kansas State University had several workshops this past spring, jointly and separately, and workshops have been held in Oregon, California, and Texas.

But Pendleton warns that "one training session does not an expert make," and says employees need supervised experience for several burns under a variety of conditions before they can consider themselves experts.

Unlike firefighters who have to battle unpredictable wildfires on terms other than their own, prescribed burners control their fires before they start them. They have a battleplan written well ahead of time which specifies the exact requirements for the burn, depending on the type of vegetation and the purpose. This burn plan specifies information such as the season and time of day, suitable soil moisture, relative humidity, air temperature, wind speed and direction, amount of grasses and forbs, amount of moisture in the grass, and precautionary measures.

To prevent the fire from escaping, ranchers surround the burn site with fireguards, a cleared strip of land or a strip sprayed with either foam or a fire retardant solution. Some ranchers put two parallel fireguards on the downwind sides and burn the land between the fireguards before they set the main fire.

The burn plan has diagrams that resemble football plays, with fires numbered to show the lighting sequence and planned direction. A rancher serves as a fire boss and orders crew members to light the fires on schedule, with diesel-gasoline drip torches. The fire boss must constantly monitor the fires and usually communicates with crew members by walkie-talkie. People with flappers, rubber strips attached to the ends of poles, follow the torchers to beat out any flames that cross the fireguards.

The plan includes emergency measures in case the fire does escape. Ranchers often have the local volunteer fire department stand by at the burn site, and they keep their own equipment handy, such as livestock sprayers, bulldozers, tractors, and disk plows.

The rancher chooses the direction of the burn to avoid danger or damage to neighboring land or homes, including smoke hazards on major roads. Many ranchers like to burn toward a plowed field or toward their own land to be safe. SCS advises ranchers to burn only when the wind is blowing in the direction of the planned burn, in addition to other



Henry A. Wright, author of a book on prescribed burning, uses a drip torch to light a prescribed fire on brush-covered rangeland in Texas as part of his research at Texas Tech University in Lubbock.

restrictions. SCS also considers the slope of the land when advising ranchers because fire will burn rapidly uphill and a slope can change a fire's direction. Canyons, hilltops, and ridges can play havoc with winds.

Fear is the most serious obstacle to the increased use of prescribed burning: an unreasonable fear of fire and a fear of liability, for possible fire and smoke damage. In some cases, the ranchers' insurance covers losses from prescribed burning, but this might not be true for all companies.

Pendleton says an increase in the number of private contractors who are prescribed burning experts and insured against damage suits will be one thing that will make prescribed burning more acceptable nationally. Ranchers will create a demand for these experts as they recognize the need for people who have extensive experience with fire under a variety of conditions.

SCS personnel are not personally liable for damage suits from escaped fires as long as they are acting within the scope of their duties, just as for any other conservation practice. SCS policy prohibits personnel from dropping the match, carrying the drip torch, or otherwise lighting the fire, in anything other than training courses. SCS conservationists with the required expertise are authorized to assist with the application of prescribed burns, including determining if conditions are favorable for a burn.

Prescribed fires can and have escaped, but Pendleton says people should no more give up on the practice because of this than they would stop any other conservation practice because of failures. They should do what they do with all other practices: study why it failed and use the experience to do it better the next time.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*,
SCS, Washington, D.C.

Prescribed Burning Is a Fast-Growing Practice in Texas

Prescribed burning showed a dramatic increase in Texas in 1982. With assistance from the Soil Conservation Service and the Texas Agricultural Extension Service, ranchers burned 71,465 acres last year compared to 31,340 acres in all prior years, according to SCS estimates.

SCS, working through local soil and water conservation districts, helped ranchers design and apply 152 burns on 44,835 acres while range specialists with the Texas Extension Service assisted with at least 21 demonstration burns on 12,230 acres. SCS and Extension Service personnel worked together to assist with 39 burns on another 14,400 acres. This year, the two agencies assisted with prescribed burns on an estimated 122,340 acres.

Texas is where SCS began giving technical assistance for prescribed burning, in 1980. In the past few years, SCS has held workshops throughout the State to teach SCS personnel the principles of prescribed burning.

Texas has about 95 million acres of rangeland and at least two-thirds of it has a moderate to severe brush problem. The main reason for the increase in prescribed burning to control this brush is the local research results that show it is effective and can be done safely, and at a lower cost than by other methods of brush control.

Dr. Henry Wright, an international authority on the use of fire in brush management, has been conducting fire research at Texas Tech University in Lubbock, Tex., since 1967. He has seen fire increase grass production from 1,100 to 3,000 pounds per acre and he has seen pastures where forage grazed by cattle has gone from 100 to 1,700 pounds per acre after a burn.

Wright's research team at Texas Tech is looking at the cost-effectiveness of new chemicals and fire and developing formulas for prescribed fires, based on brush and soil types, environmental con-

ditions, and costs. Wright says ranchers can use just fire every 5 to 10 years on a mesquite-tobosa plant community, but other plant communities might require less frequent burning and the use of chemicals to treat the secondary growth invasions. It is generally advantageous to use a combination of methods such as fire, mechanical, and chemical, to control brush with a brush management system.

Texas A&M, the Texas Agricultural Experiment Station, Texas A&I, the Texas Parks and Wildlife Department, and others are also studying prescribed burning.

A good grass cover can stop the excessive erosion of the extremely fragile soils on some of Texas' brush-covered rangeland. Grass is also a much more efficient user of water than brush. Brush has deep roots and uses more than twice the amount of water used by grasses to grow the same amount of plant tissue. When this brush is burned, the underground aquifers are replenished and water often begins flowing to the surface in springs, seeps, streams, and ponds.

In one watershed, SCS has seen streams and springs that had been dry for 20 years begin flowing after the brush was controlled. A USDA Agricultural Research Service researcher estimates that Texas can save more than 10 million acre-feet of water a year by controlling excessive brush. This is more water than all the municipalities in Texas currently use in a year and is a valuable resource in a State where the future of the water supply is a major concern.

Ranchers burn entire pastures at one time. In Texas, SCS recommends burning only on days that meet the following weather conditions: wind speed, 6 to 15 miles per hour; relative humidity, 20 to 60 percent; and temperature, from 45 to 70 degrees Fahrenheit. This produces a cool fire that will control juniper, prickly-pear, *tasajillo*, young mesquite seedlings, broomweed seedlings, and certain other plants. It is such a cool fire that the grasses and forbs are not killed

and are still green near the ground.

It is very different from the hot, earth-scorching wildfires that may begin when the temperature is 100 degrees, winds are 50 to 55 miles per hour, and the humidity is 5 to 10 percent.

The best time to use prescribed burning for warm season plants in most of Texas is late January to early March, before the ground warms up.

Besides meeting the demanding weather requirements, each rancher has a wind direction individually prescribed, based on the location of homes, roads, and fields. Since there were only a few days during the season last year when wind direction, wind speed, relative humidity, and air temperature were ideal for burning, many ranchers were unable to burn. If borderline conditions exist, the burn should be postponed until conditions improve, even if that means waiting a year.

Burned areas should be deferred from grazing before and after the burn. Most ranchers defer their pastures several months before a burn to grow enough grass, ideally at least 2,000 pounds per acre, to fuel the fire. The length of the deferment after the burn varies from a few weeks to several weeks depending on the rancher's goals.

The main lesson Texas ranchers learned last year was that they absolutely have to have enough grass and the right weather conditions for a successful prescribed burn. SCS learned that ranchers were reluctant to act as fire bosses on their first burns so they need help burning small areas first to give them more confidence. In many cases, neighboring ranchers helped each other. SCS specialists encourage this and foresee the day when demand is so high they will have to limit technical assistance on burn days to first-timers who do not have experienced neighbors to help.

Dale D. Allen,
public affairs specialist, SCS, Temple, Tex.

Rhett H. Johnson,
range conservationist, SCS, Temple, Tex

California Learns to Burn

More than 50 Soil Conservation Service conservationists and technicians gathered for a prescribed burning workshop at northern California's Mendocino National Forest last year, and others attended a similar workshop in southern California this year.

The SCS personnel toured burned sites in the 165-square-mile Grindstone Project area in Mendocino National Forest and also toured sites in the 59,000-acre Grapevine Coordinated Resources Plan area nearby.

Mendocino National Forest includes more than 1 million acres, with up to 500,000 acres of chamise chaparral plant communities in the foothills, and patches of private rangeland in the midst of the Federal land.

The Grindstone Project is the oldest of several USDA Forest Service projects at Mendocino National Forest that use prescribed burning to manage chaparral. It was in this project that the Forest Service developed its burn prescription for chamise chaparral.

For about 30 years, the Forest Service has been burning different brush areas in the Mendocino National Forest in rotation, to create a mosaic of brush stands of various ages and to prevent the growth of a giant area of mature brush that can fuel a catastrophic fire. In a chamise chaparral community, plant growth begins to level off at 20 to 25 years and the brush becomes very susceptible to wildfires.

SCS District Conservationist Chuck Bell, a participant in the workshop at the Mendocino National Forest, says the Forest Service usually burns patches no larger than 50 acres each. They burn only small patches for esthetic reasons and to create a mixture of wildlife habitats. Bell says such small areas contrast with the thousands of acres that would be decimated by a wildfire.

Another difference is that a wildfire is most likely to begin in the summer while a prescribed burn is set in cooler seasons. Especially in California's hot, dry summers, vegetation is so dry the

wildfire burns everything to the ground, destroying organic matter on the surface and killing seeds that might have survived a fire in a cooler season.

In 1953, such a catastrophic wildfire burned thousands of acres in Mendocino National Forest and trapped 13 missionaries in a narrow canyon, killing them. The wind had shifted and reversed itself, engulfing the missionaries who had been recruited from a campground retreat to fight the forest fire. This fire caused the Grindstone Project to expand and there have been no major fires since, although there are many small wildfires each year.

The Grapevine Coordinated Resources Plan began in 1977 as the result of a national agreement on how government agencies and local conservation districts can coordinate management of intermingled parcels of public and private lands. The Grapevine plan, and an earlier agreement in the same area, increased SCS's involvement in prescribed burning in California, along with improvements in technology.

Last year, during the 3-day workshop at the Mendocino National Forest, Bell and other representatives from various State and Federal government agencies praised the conservation benefits of prescribed burning.

Bell told the group that SCS is interested in prescribed burning mainly because it prevents catastrophic wildfires that expose many watersheds to erosion and resulting sediment problems. SCS also wants to see fire used to maintain the chamise chaparral community which it believes is best suited to holding the soil in place.

But Bell says SCS is interested in other benefits of prescribed burning, too, such as rejuvenating food and cover for wildlife. He says coordinated resources planning encourages agencies to consider each other's interests. For example, the U.S. Department of the Interior's Bureau of Land Management and USDA's Forest Service are interested in managing the forests for wildlife, timber, and recreational uses. The California Department of

Forestry (CDF) is concerned primarily with protecting lives and property.

In recent years, CDF has had to fight an increasing number of fires and began to look for a reason. They realized the cause was the chamise chaparral buildup that occurred after ranchers stopped burning in the sixties, because they were discouraged by the increasing threat of lawsuits and the costs of burning.

The chamise chaparral covers about 10 million acres in California and catastrophic wildfires on these lands threaten the densely populated communities in southern California as well as ranches in northern California.

Two years ago, mainly to protect life and property, California set up the Chaparral Management Program which provides liability insurance and up to 90 percent cost sharing for prescribed burning on private lands when a CDF burn plan is used.

Added to these financial incentives is the increased safety of burning with a heli-torch, a device invented in Canada in 1979 and improved with testing in the Mendocino National Forest. The heli-torch is a 55-gallon drum filled with a

jelled gasoline and suspended from a helicopter. The pilot uses remote controls to electronically push small globs of the jelly through a pipe where they are lit and dropped. The heli-torch is safer than a drip torch because it can set fires at a higher relative humidity and eliminates the danger of having ground crews trapped by a fire.

The Forest Service has a 22-minute slide-tape show on prescribed burning in Mendocino National Forest, called "The Grindstone Project," available from LaVon Perez, Public Affairs Specialist, Mendocino National Forest, 420 East Laurel Street, Willows, Calif. 95988. The Soil Conservation Service has a 10-minute slide-tape show on prescribed burning and coordinated resources planning called "Coordinated Resources Planning: The RCD Way," available from the Information Section, U.S. Department of Agriculture, Soil Conservation Service, 2828 Chiles Road, Davis, Calif. 95616.

Marilyn Guelden,
public affairs specialist, SCS, Davis, Calif.



Soil Conservation Service employees examine soil quality and plant growth after a prescribed burn in northern California.

Photo by June Davidek,
public affairs specialist,
SCS, Davis, Calif.

Book on Fire Ecology Published

Henry Wright and Arthur Bailey's book, "Fire Ecology: United States and Southern Canada" is a timely progress report on applied fire ecology.

The book's final chapter, Chapter 16, is a guidebook on prescribed burning. It covers everything from firing techniques to air quality and smoke management. It includes burn prescription guides for many plant communities. The chapter ends with a detailed explanation of how Dr. Wright and his coworkers plan a prescribed burn, based on 15 years of experience. His advice is so practical it includes comments on public relations.

At the beginning of this chapter, the authors say prescribed burning is an art as well as a science and that only people who have good judgment and courage, backed by experience, should conduct burns.

The book, designed as a reference book for forest and range managers and graduate students, has 502 pages and is well illustrated with black-and-white photographs, diagrams, and maps.

In Chapters 2 through 4, the authors discuss the effects of heat on plants and the effects of fire on soil, water, and wildlife. Chapters 5 through 15 cover the effects of fire on a wide variety of plant communities, from grasslands to spruce-fir. Five of the chapters were written in cooperation with USDA's Forest Service.

All of the chapters on plant communities discuss the historical role of fire in each plant community and the management implications of prescribed burning. Every chapter in the book has a list of references.

This book is available for \$49.50 plus State sales tax, if any, prepaid, from John Wiley and Sons, Inc., One Wiley Drive, Somerset, N.J. 08873. Or order by phone at (201) 469-4400. (Order No. 1-09033-6.)

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Meetings

July	5-8	17th National Agricultural Plastics Congress, Manchester, N.H.
	10-14	National Environmental Health Association, Norfolk, Va.
	12-15	Izaak Walton League of America, Harrisburg, Pa.
	18-22	Fourth International Conference on Permafrost, Fairbanks, Alaska
	31-Aug. 3	American Agricultural Economics Association, West Lafayette, Ind.
	31-Aug. 3	Soil Conservation Society of America, Hartford, Conn.
August	7-10	National Farm and Power Equipment Dealers Association, Kansas City, Mo.
	12-17	First National Congress for Environmental Education Futures, Burlington, Vt.
	14-19	American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Washington, D.C.
	21-25	Association of State and Interstate Water Pollution Control Administrators, St. Louis, Mo.
	28-Sept. 2	National Audubon Society, Estes Park, Colo.
September	15-18	American Horticultural Society, Philadelphia, Pa.
	18-20	World Fertilizer Conference, New York, N.Y.
	19-23	International Association of Fish and Wildlife Agencies, Milwaukee, Wis.
	28-30	National Waterways Conference, Houston, Tex.
October	1-5	American Forestry Association, Washington, D.C.
	2-7	Water Pollution Control Federation, Atlanta, Ga.
	9-13	National Association of County Agricultural Agents, Wichita, Kans.
	16-19	National Forest Products Association, Vancouver, British Columbia, Canada
	17-21	American Society of Civil Engineers, Houston, Tex.
	20-23	National Association of Biology Teachers, Inc., Philadelphia, Pa.
	31-Nov. 3	Geological Society of America, Indianapolis, Ind.
November	14-21	The National Grange, San Antonio, Tex.
	19-22	American Society of Landscape Architects, Indianapolis, Ind.
	28-Dec. 1	National Farmers Organization, Denver, Colo.
December	4-7	Agri-Turf Irrigation Exposition and Conference, Denver, Colo.
	4-7	American Society of Farm Managers and Rural Appraisers, San Diego, Calif.
	5-9	American Geophysical Union, San Francisco, Calif.
	7-9	Keep America Beautiful, Inc., Washington, D.C.
	13-16	American Society of Agricultural Engineers, Chicago, Ill.